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## Artificial Intelligence in Video Games

For my semester-long project, I have decided to investigate and explore the use of AI in video games. Since it is a very broad topic, I am mostly interested in its use for playing the game like an NPC. Take, for example, in Mario Kart: computer players don't just follow a set-in-stone track but must react to the actual player's movements and actions. My goal for this project is to understand how video games use AI in this way by implementing it into a game myself to gain first-hand experience in the field. The game I have decided to implement an AI into is the classic game Snake. As the video game industry continues to grow with more interest and the explosion of technology, the use of AI in video games will only expand, making it an exciting area to explore and discover.

Some of the key challenges with this topic lie in the fact that, to implement AI into a game, you often must build the game yourself. Modern games typically wouldn't allow you to mess around in their code to add an AI that plays the game for you. By creating the game myself, I will have much more control over the AI and can closely observe the data or even change game rules to see how the AI adapts.

From the little research I have already done and seen in the past, I can see a couple of different ways to approach the topic. The first approach is using A\* notation, as playing Snake is very similar to navigating a maze, except the maze changes and grows every time you eat an apple. The other approach I have considered is using machine learning. By using machine learning and

letting the AI play thousands of times, simply telling it that the higher the score, the better, it can evolve and create its own tactics. This approach would also benefit from changing the rules of the game; while the AI would know how to play the original game, with rule changes, it would have to figure it out again based on its understanding of the original version.

For this project, I will begin by learning more about AI in video games and the methods already in use. I will then compare the two approaches I mentioned earlier. For the actual software part of the project, I will need to code my own version of Snake in Python, presumably using PyGame for the interface and background actions. Once that is done, I will begin coding the AI, potentially with two versions if the comparison between the approaches doesn't yield a clear result.

In conclusion, I am excited to learn more about a field that has always interested me and that I have often questioned. I plan to read a lot more about AI implementations across a multitude of video game genres before attempting to implement my own. This project not only provides an opportunity to deepen my understanding of AI algorithms, but also see into game design and AI development.